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**BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES**

Application Number: 09/685,052
Filing Date: October 06, 2000
Appellant(s): DAMON ET AL.

John A. Brady
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 14 November 2005 appealing from the Office action mailed 13 September 2005.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

5,719,680	Yoshida et al.	2-1998
5,854,854	Cullen et al.	12-1998
6,327,385	Kamitani	12-2001
5,835,241	Saund	11-1998
5,841,458	Kroon	11-1998
5,748,330	Wang et al.	5-1998
5,497,180	Kawakami et al.	3-1996

Berns, Roy S., "Principles of Color Technology", third edition, copyright 2000, pages 170-174.

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claims 1, 4, 9 and 14 are rejected under 35 U.S.C. 102(b) as being anticipated by Yoshida (US Patent 5,719,680).

Regarding claim 1: Yoshida discloses a method for reducing the occurrence of print artifacts in an imaging machine comprising the steps of applying electronic printhead skew correction to image data (column 2, lines 15-17 of Yoshida) corresponding to at least one of a plurality of image planes (column 2, lines 29-32 of Yoshida) to generate skew corrected

image data (column 2, lines 19-22 of Yoshida); and applying an associated halftone screen (yellow halftone screen) to said skew corrected image (column 2, line 64 to column 3, line 2 of Yoshida) to reduce distortion which would be introduced by use of said associated halftone screen prior to said electronic printhead skew correction (column 3, lines 5-7 and lines 19-26 of Yoshida). The yellow halftone screen is applied (column 2, line 64 to column 3, line 2 of Yoshida). The magenta head, and thus the magenta halftone screen, is skew corrected (column 3, lines 19-25 of Yoshida) such that said magenta halftone screen is in the correct alignment with the yellow halftone screen (column 3, lines 25-28 of Yoshida), thus reducing any associated distortion that would have otherwise been present prior to skew correction.

Regarding claim 4: Yoshida discloses a method for reducing the occurrence of print artifacts in an imaging machine, comprising the steps of determining which of a plurality of printhead units require printhead skew correction (column 2, lines 15-17 of Yoshida); receiving continuous tone data to be printed (column 2, lines 17-19 of Yoshida); generating from said continuous tone data a plurality of image bytemaps (column 2, lines 12-14 and lines 17-18 of Yoshida), each of said plurality of image bytemaps corresponding to a respective one of a

plurality of image planes (column 2, line 64 to column 3, line 5 of Yoshida) and to a respective one of said plurality of printheads (column 2, lines 29-32 of Yoshida); and applying electronic printhead skew correction (figure 4 and column 2, lines 19-22 of Yoshida) to each image bytemap associated with a printhead unit requiring printhead skew correction (column 2, lines 58-63 of Yoshida) to generate a corresponding skew corrected image bytemap (column 2, lines 19-22 of Yoshida). Since image data is supplied for printing (column 2, lines 17-19 of Yoshida) and there are a plurality of print heads (column 2, lines 59-61 of Yoshida), then there are inherently a plurality of image bytemaps, since each bytemap is the data that each corresponding print head needs to print.

Yoshida further discloses applying an associated halftone screen to each of said corresponding skew corrected image bytemap and to each of said plurality of image bytemaps not receiving application of electronic printhead skew correction to form corresponding halftoned image data (column 3, lines 16-18 of Yoshida). Since the dot data for the print heads is supplied to the LED heads (column 3, lines 16-18 of Yoshida), it is inherent that an associated halftone screen is applied to each of the bytemaps since said associated halftone screens are required for determining print dot locations for each printed

color. In order to print the image, said associated halftone screens inherently have to be applied to each color that is to be printed, which would therefore include both the skew corrected image bytemaps and the image bytemaps not receiving application of electronic printhead skew correction.

Yoshida further discloses serializing each of said corresponding halftoned image data to a respective one of said plurality of printhead units (column 3, lines 14-18 of Yoshida). The data supplied to the print heads must inherently be halftone data in order for the print heads to print the image (column 3, lines 16-22 of Yoshida).

Regarding claim 9: Yoshida discloses a method for reducing the occurrence of print artifacts in an imaging machine, comprising the steps of determining which of a plurality of printhead units require printhead skew correction (column 2, lines 15-17 of Yoshida); receiving continuous tone data to be printed (column 2, lines 17-19 of Yoshida); and generating from said continuous tone data a plurality of image bytemaps (column 2, lines 12-14 and lines 17-19 of Yoshida), each of said plurality of image bytemaps corresponding to a respective one of a plurality of image planes (column 2, line 64 to column 3, line 5 of Yoshida) and to a respective one of said plurality of printheads (column 2, lines 29-32 of Yoshida); and establishing

at least one halftone screen (figure 5 and column 2, lines 18-22 of Yoshida). Supplying data to a print head (figure 5 and column 2, lines 21-22 of Yoshida) inherently requires a halftone screen in order to obtain the print dot locations.

Yoshida further discloses, for each of said plurality of image planes associated with a printhead requiring printhead skew correction, shifting a starting point of application of said at least one halftone screen to the corresponding image bytemap in a direction opposite to and of a magnitude equal to a shift direction and shift magnitude of an electronic printhead skew correction which is to be applied (column 3, lines 19-28 of Yoshida). To correct the skew of the magenta head, the print head position is shifted to compensate (column 3, lines 19-25 of Yoshida) and is thus correctly superimposed on the yellow image (column 3, lines 25-28 of Yoshida). Printing the dots for the magenta head (column 3, lines 20-25 of Yoshida) inherently requires a halftone screen in order to determine the location of the printed dots. Since the skew is corrected (column 3, line 19 of Yoshida) and the magenta head is thus properly aligned with the yellow image (column 3, lines 27-28 of Yoshida), then the starting point of said halftone screen must inherently be shifted in a direction opposite to and of a magnitude equal to a shift direction and shift magnitude of an electronic printhead

skew correction in order to properly compensate for the amount of skew.

Yoshida further discloses applying said at least one halftone screen to said corresponding image bytemap (column 2, lines 17-22 of Yoshida). The image data for each print head (column 2, lines 17-19 of Yoshida) constitutes an image bytemap. A halftone screen is inherently required in order for each print head to print based on said image data.

Yoshida further discloses applying said electronic printhead skew correction to the halftone image bytemap of the first applying step (column 2, lines 15-17 of Yoshida); and serializing the halftoned image bytemap of the second applying step to the respective one of said plurality of printhead units (column 3, lines 14-18 of Yoshida).

Regarding claim 14: Yoshida discloses a method for reducing the occurrence of print artifacts in an imaging machine comprising the steps of applying an associated, pre-compensated halftone screen (yellow halftone screen) (column 2, line 64 to column 3, line 2 of Yoshida) to image data (column 2, lines 15-17 of Yoshida) corresponding to at least one of a plurality of image planes (column 2, lines 29-32 of Yoshida) to reduce halftone noise introduced by electronic printhead skew correction (column 3, lines 5-7 and lines 19-28 of Yoshida); and

applying electronic skew correction (column 2, lines 19-22 of Yoshida) to data resulting from said applying said pre-compensated halftone screen (column 3, lines 19-28 of Yoshida). The yellow halftone screen is applied (column 2, line 64 to column 3, line 2 of Yoshida). The magenta head, and thus the magenta halftone screen, is skew corrected (column 3, lines 19-25 of Yoshida) such that said magenta halftone screen is in the correct alignment with the yellow halftone screen (column 3, lines 25-28 of Yoshida), thus reducing any associated distortion that would have otherwise been present prior to skew correction.

Claims 2, 5-6, 15 and 17-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshida (US Patent 5,719,680) in view of Cullen (US Patent 5,854,854) and Kamitani (US Patent 6,327,385 B1).

Regarding claims 2 and 15: Yoshida does not disclose expressly adding text characters to said skew corrected image data to form a composite bit map; dividing said composite bit map into a plurality of blocks; identifying text characters which bridge adjoining of said blocks; associating said identified text characters with a respective one of said plurality of blocks; and shifting an entirety of said each of

said identified text characters by a skew correction factor associated with said respective one of said plurality of blocks.

Cullen discloses adding text characters to said skew corrected image data to form a composite bit map (figure 13 and column 4, lines 11-14 of Cullen); dividing said composite bit map into a plurality of blocks (column 4, lines 5-8 of Cullen); identifying text characters of each of said blocks (column 5, lines 46-55 of Cullen); associating said identified text characters with a respective one of said plurality of blocks (column 5, lines 35-36 and lines 46-49 of Cullen); and shifting an entirety of said each of said identified text characters by a skew correction factor associated with said respective one of said plurality of blocks (column 5, lines 53-55 of Cullen). Each rectangle of the composite document image is skew corrected based on the associated skew angle (column 5, lines 53-55 of Cullen). The correction by said skew angle is the skew correction factor associated with a particular rectangular block.

Yoshida and Cullen are combinable because they are from the same field of endeavor, namely skew correction for image print data. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to apply the method of correcting for the skew of text, as taught by Cullen, to the

general skew correction method taught by Yoshida. The motivation for doing so would have been to reduce the amount of required computer memory and increase the efficiency of the image processing (column 5, lines 22-27 of Cullen). Therefore, it would have been obvious to combine Cullen with Yoshida.

Yoshida in view of Cullen does not disclose expressly identifying text characters which bridge adjoining of said blocks; and associating said identified text with a respective one of said plurality of blocks.

Kamitani discloses identifying text characters which adjoin each other (figure 5 and column 6, lines 39-49 of Kamitani); and associating each character with a respective portion (figure 7a and column 7, lines 28-32 and lines 36-43 of Kamitani).

Yoshida in view of Cullen is combinable with Kamitani because they are from the same field of endeavor, namely correction of image print data. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to detect characters which adjoin each other, as taught by Kamitani, which would result in a character adjoining two of said blocks taught by Cullen, and then separating each character into their respective portions, as taught by Kamitani, thus associating said identified text characters with a respective one of the blocks taught by Cullen. The motivation for doing so

would have been to correct image data for the case of overlapping characters (column 1, lines 62-67 of Kamitani). Therefore, it would have been obvious to combine Kamitani with Yoshida in view of Cullen to obtain the invention as specified in claims 2 and 15.

Regarding claim 5: The arguments regarding claim 2 are incorporated herein. Since there are a plurality of image bytemaps (column 2, lines 12-14 and lines 17-18 of Yoshida), each of said bytemap corresponding to a respective one of a plurality of image planes (column 2, line 64 to column 3, line 5 of Yoshida), then it is inherent that the text characters which are added to the skew corrected image data would therefore be added to at least one of said plurality of image bytemaps to generate at least one composite bytemap.

Regarding claim 6: Yoshida discloses a method for reducing the occurrence of print artifacts in an imaging machine, comprising the steps of determining which of a plurality of printhead units require printhead skew correction (column 2, lines 15-17 of Yoshida); receiving continuous tone data to be printed (column 2, lines 17-19 of Yoshida); and generating from said continuous tone data a plurality of image bytemaps (column 2, lines 12-14 and lines 17-18 of Yoshida), each of said plurality of image bytemaps corresponding to a respective one of

a plurality of image planes (column 2, line 64 to column 3, line 5 of Yoshida) and to a respective one of said plurality of printheads (column 2, lines 29-32 of Yoshida), wherein at least one of said plurality of image bytemaps corresponds to a printhead which requires printhead skew correction (column 2, lines 59-63 of Yoshida). Since image data is supplied for printing (column 2, lines 17-19 of Yoshida) and there are a plurality of print heads (column 2, lines 59-61 of Yoshida), then there are inherently a plurality of image bytemaps, since each bytemap is the data that each corresponding print head needs to print.

Yoshida does not disclose expressly that at least one of said plurality of image bytemaps includes text characters; dividing said composite bit map into a plurality of blocks; assigning a skew correction factor to each of said plurality of blocks; identifying characters which bridge adjoining of said blocks; associating each of said identified text characters with a respective one of said plurality of blocks; and shifting an entirety of said each of said identified text characters by a skew correction factor associated with said respective one of said plurality of blocks.

Cullen discloses that the image bytemap includes text characters (figure 13 and column 4, lines 11-14 of Cullen);

dividing said composite bit map into a plurality of blocks (column 4, lines 5-8 of Cullen); assigning a skew correction factor to each of said plurality of blocks (column 5, lines 46-48 of Cullen); identifying text characters of each of said blocks (column 5, lines 46-55 of Cullen); associating said identified text characters with a respective one of said plurality of blocks (column 5, lines 35-36 and lines 46-49 of Cullen); and shifting an entirety of said each of said identified text characters by a skew correction factor associated with said respective one of said plurality of blocks (column 5, lines 53-55 of Cullen). Each rectangle of the composite document image is skew corrected based on the associated skew angle (column 5, lines 53-55 of Cullen). The correction by said skew angle is the skew correction factor associated with a particular rectangular block.

Yoshida and Cullen are combinable because they are from the same field of endeavor, namely skew correction for image print data. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to apply the method of correcting for the skew of text, as taught by Cullen, to the general skew correction method taught by Yoshida. The motivation for doing so would have been to reduce the amount of required computer memory and increase the efficiency of the

image processing (column 5, lines 22-27 of Cullen). Therefore, it would have been obvious to combine Cullen with Yoshida.

Yoshida in view of Cullen does not disclose expressly identifying text characters which bridge adjoining of said blocks; and associating said identified text with a respective one of said plurality of blocks.

Kamitani discloses identifying text characters which adjoin each other (figure 5 and column 6, lines 39-49 of Kamitani); and associating each character with a respective portion (figure 7a and column 7, lines 28-32 and lines 36-43 of Kamitani).

Yoshida in view of Cullen is combinable with Kamitani because they are from the same field of endeavor, namely correction of image print data. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to detect characters which adjoin each other, as taught by Kamitani, which would result in a character adjoining two of said blocks taught by Cullen, and then separating each character into their respective portions, as taught by Kamitani, thus associating said identified text characters with a respective one of the blocks taught by Cullen. The motivation for doing so would have been to correct image data for the case of overlapping characters (column 1, lines 62-67 of Kamitani). Therefore, it would have been obvious to combine Kamitani with

Yoshida in view of Cullen to obtain the invention as specified in claim 6.

Further regarding claims 17-19: Since the entire identified text character is associated with a respective one of said plurality of blocks and shifted by a skew correction factor, as recited in claims 2, 5 and 6, from which claims 17, 18 and 19 respectively depend, then clearly the minority portion of each text character located in adjoining of said blocks is shifted.

Claims 11-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshida (US Patent 5,719,680) in view of Cullen (US Patent 5,854,854) and Saund (US Patent 5,835,241).

Regarding claim 11: Yoshida discloses a method for reducing the occurrence of print artifacts in an imaging machine, comprising the steps of determining which of a plurality of printhead units require printhead skew correction (column 2, lines 15-17 of Yoshida); receiving continuous tone data to be printed (column 2, lines 17-19 of Yoshida); generating from said continuous tone data a plurality of image bytemaps (column 2, lines 12-14 and lines 17-18 of Yoshida), each of said plurality of image bytemaps corresponding to a respective one of a plurality of image planes (column 2, line 64

to column 3, line 5 of Yoshida) and to a respective one of said plurality of printheads (column 2, lines 29-32 of Yoshida), wherein at least one of said plurality of image bytemaps corresponds to a printhead which requires printhead skew correction (column 2, lines 59-63 of Yoshida); and applying electronic printhead skew correction (figure 4 and column 2, lines 19-22 of Yoshida) to each image bytemap associated with each said printhead unit which requires said printhead skew correction (column 2, lines 58-63 of Yoshida). Since image data is supplied for printing (column 2, lines 17-19 of Yoshida) and there are a plurality of print heads (column 2, lines 59-61 of Yoshida), then there are inherently a plurality of image bytemaps, since each bytemap is the data that each corresponding print head needs to print.

Yoshida does not disclose expressly that at least one of said plurality of image bytemaps includes text characters; dividing said composite bit map into a plurality of blocks; assigning a skew correction factor to each of said plurality of blocks; identifying a vertical centerline of said each of said text characters; associating said vertical centerline of said each of said text characters with a respective one of said plurality of blocks; and, for each text character bridging a block boundary between an associated block and an adjacent

block, performing the step of shifting a minority portion of said each text character located in said adjacent block not present in said associated block by an amount corresponding to a difference between a skew correction factor corresponding to said associated block and a skew correction factor corresponding to said adjacent block.

Cullen discloses that the image bytemap includes text characters (figure 13 and column 4, lines 11-14 of Cullen); dividing said composite bit map into a plurality of blocks (column 4, lines 5-8 of Cullen); assigning a skew correction factor to each of said plurality of blocks (column 5, lines 46-48 of Cullen); identifying a rectangle of said each of said text characters (column 5, lines 33-36 of Cullen); and associating said rectangle of said each of said text characters with a respective one of said plurality of blocks (column 5, lines 46-48 of Cullen). Each rectangle of the composite document image is skew corrected based on the associated skew angle (column 5, lines 53-55 of Cullen). The correction by said skew angle is the skew correction factor associated with a rectangle.

Cullen further discloses that each rectangular block is corrected for the corresponding skew correction (column 14, lines 51-57 of Cullen). Therefore, if there is a text character bridges a block boundary between an associated block and an

adjacent block, then the portion of said character in the associated block will inherently be skew corrected by the skew correction performed for said associated block and the portion of said character in the adjacent block will inherently be skew corrected by the skew correction formed for said adjacent block.

Cullen does not disclose expressly using a vertical centerline instead of a rectangle for the steps of identifying and associating. However, using a vertical centerline instead of a rectangle would have been an obvious design choice to one of ordinary skill in the art since a vertical centerline can also be used to measure an angle, such as a skew angle, associated with a region. The use of vertical centerline for the measurement of an angle is an old and well-known method used in the calculation and manipulation of image regions.

Yoshida and Cullen are combinable because they are from the same field of endeavor, namely skew correction for image print data. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to apply the method of correcting for the skew of text, as taught by Cullen, to the general skew correction method taught by Yoshida. The motivation for doing so would have been to reduce the amount of required computer memory and increase the efficiency of the

image processing (column 5, lines 22-27 of Cullen). Therefore, it would have been obvious to combine Cullen with Yoshida.

Yoshida in view of Cullen does not disclose expressly that, for each text character bridging a block boundary between an associated block and an adjacent block, performing the step of shifting a minority portion of said each text character located in said adjacent block not present in said associated block by an amount corresponding to a difference between a skew correction factor corresponding to said associated block and a skew correction factor corresponding to said adjacent block.

Saund discloses using interpolating image data (column 13, lines 48-54 of Saund) in order to display said image data in a properly de-warped image space (column 13, lines 31-34 of Saund).

Yoshida in view of Cullen is combinable with Saund because they are from the same field of endeavor, namely the alignment of image data. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to interpolate the image data to correct for warping, as taught by Saund. A text character bridging a block boundary between an associated block and an adjacent block would therefore have a minority portion shifted by an amount corresponding to a difference between a skew correction factor corresponding to said

associated block and a skew correction factor corresponding to said adjacent block since the warping, or skew correction, amount for said minority portion would be an interpolation between said associated block and said adjacent block. The motivation for doing so would have been to properly show each pixel of an image in the transformed image space (column 13, lines 25-27 of Saund). Therefore, it would have been obvious to combine Saund with Yoshida in view of Cullen to obtain the invention as specified in claim 11.

Regarding claim 12: Yoshida discloses applying a halftone screen to said plurality of image bytemaps (column 2, lines 18-22 of Yoshida) after the step of applying electronic printhead skew correction (column 2, lines 15-17 of Yoshida). Supplying data to a print head (figure 5 and column 2, lines 21-22 of Yoshida) inherently requires a halftone screen in order to obtain the print dot locations. Furthermore, since image data is supplied for printing (column 2, lines 17-19 of Yoshida) and there are a plurality of print heads (column 2, lines 59-61 of Yoshida), then there are inherently a plurality of image bytemaps, since each bytemap is the data that each corresponding print head needs to print.

(10) Response to Argument

Appellant, under the heading "The Yoshida Reference", argues various general aspects of the primary reference Yoshida (US Patent 5,719,680), but does not address specific claims or claim limitations. Nevertheless, Examiner fully addresses Appellants allegations presented therein.

Appellant argues that Yoshida (US Patent 5,719,680) does not teach a halftone screen, or any kind of screen (see page 12, lines 6-11 of Appeal Brief); that the use of a halftone screen is not inherent in applying data to a printhead (see page 12, lines 12-17 of Appeal Brief); that there is no halftone screen since there are no shade variations (see page 12, line 18 to page 13, line 13 of Appeal Brief); that correcting the skew of a printhead does not necessarily involve a halftone screen (see page 13, lines 14-19 of Appeal Brief); and that Yoshida only teaches printing solid colors by printing rectangles of dots (see page 13, line 20 to page 14, line 8 of Appeal Brief).

Examiner responds that a halftone screen is implicit in the teachings of Yoshida, as would have been apparent to one of ordinary skill in the art at the time of the invention. One exemplary and a sufficient demonstration that halftone screening is implicit in the teachings of Yoshida is given by a reading of portions of Kroon (US Patent 5,841,458), which was previously

cited by Examiner in the final rejection mailed 13 September 2005. Kroon teaches that electrophotographic printers use halftone screens to form color images on the printing medium (column 1, lines 11-20 and column 2, lines 20-24 and lines 34-37 of Kroon) using the standard cyan, magenta, yellow and black primary ink colors to form the resultant image (column 1, lines 39-45 of Kroon). The system of Yoshida is also an electro-photographic printer (column 2, lines 1-9 of Yoshida) that uses the standard cyan, magenta, yellow and black primary ink colors to form the resultant image (column 2, lines 59-63 of Yoshida) (also see column 1, lines 7-20 of Yoshida). The "solid colors" that Appellant alleges are the only colors printed are simply the halftone color separations that are used to print the resultant image. An example of this is demonstrated in Kroon (column 1, lines 39-47 of Kroon). Thus, the system of Yoshida does not merely print "solid colors" on a printing medium, colors that happen to coincide with the standard primary ink colors used in halftone screening and printing (column 1, lines 41-47 of Kroon and column 2, lines 28-32 of Yoshida). Kroon demonstrates what one of ordinary skill in the art at the time of the invention would clearly have known about color halftone screening and color halftoning, specifically that primary colors are printed as dots in a specifically superimposed pattern to

generate the shades of color for a color image to be printed (column 1, lines 39-45 and column 2, lines 20-24 of Kroon). Additionally, it would be unreasonable to suggest that Yoshida only prints solid colors, one dot at a time on a rectangular grid, since there is no rational purpose behind such an apparatus, especially given the fact that Yoshida teaches skew correction (deskewing) (column 2, lines 15-22 of Yoshida). If only solid colors are printed, then there is no need for any kind of skew correction. The skew correction corrects the registration between the different colors that are printed (column 1, lines 11-18 of Kroon and column 1, lines 11-20 of Yoshida), which in turn print the resultant image (column 1, lines 41-47 of Kroon and column 2, lines 28-32 of Yoshida). If only solid colors were printed, there would be no need for any kind of skew correction since registration is only needed to print the image forming dots at the proper location, thus properly forming the halftoned image.

While the above arguments should sufficiently establish that halftoning and halftone screens are implicit in the teachings of Yoshida, additional arguments, which are quoted from page 2, line 16 to page 4, line 7 and page 5, line 9 to page 8, line 16 of said final rejection, are presented herein:

'Yoshida (US Patent 5,719,680) clearly and unambiguously teaches color halftoning. This is evidenced by several factors:

(1) The apparatus of Yoshida includes image data memory (figure 1(5) of Yoshida) which stores image data that is to be reproduced by image forming elements (figure 1(3) of Yoshida) which are controlled by driving elements (figure 1(2) of Yoshida), wherein said image forming elements and said driving elements are part of the print head (figure 1(1) of Yoshida) (column 2, lines 17-22 of Yoshida).

(2) Yoshida does not, as Applicant contends, merely print solid colors. The "solid colors" are the colors printed as dots by the cyan, magenta, yellow and black print heads in order to produce an image (column 1, lines 30-34 of Yoshida). Yoshida clearly states "It is accordingly an object of the present invention to improve color registration in a color printer. The invented color printer has a plurality of printing heads for generating images in different colors, which are printed in a superimposed fashion on a printing medium. Each image is generated one line at a time, each line consisting of at least two parts." Correcting color registration is purely an aspect of halftone image artifact correction since color registration correction is the correction of the precise distances of each of the primary color dots, such as cyan, magenta, yellow and black, used to form a color image. Further, as the quoted passage clearly states, the plurality of printing heads are for

generating images in different colors, which are printed in a superimposed fashion on a printing medium. This is clearly halftoning of color images.

(3) Figure 5 of Yoshida does not, as Applicant contends, show a solid pattern. If one simply observes figure 5 of Yoshida, one can clearly see that white circles are *not* present at each dot position. Further, figure 5 of Yoshida is used illustratively to show the how the magenta dots are skew corrected with respect to the yellow dots (column 2, line 64 to column 3, line 7 of Yoshida). Figure 5 of Yoshida is not meant to exhaustively demonstrate all possible operations of the invention of Yoshida.

(4) As is abundantly well-known to those of ordinary skill in the art, color halftoning is performed by printing solid color dots, in this case the commonly used primary colors cyan, magenta, yellow and black, in a specifically superimposed manner to form a color image. As discussed above, this is clearly the function of the invention of Yoshida. The "solid colors" that Applicant alleges are, in fact, merely the individual cyan, magenta, yellow and black dots that are used in the overall formation of the image. These solid color dots are the individual dots that are used in halftoning operations to form the overall color image (column 1, lines 32-34 of Yoshida).

(5) "A patent need not teach, and preferably omits, what is well known in the art. *In re Buchner*, 929 F.2d 660, 661, 18 USPQ2d 1331, 1332 (Fed. Cir.

1991); *Hybritech, Inc. v. Monoclonal Antibodies, Inc.*, 802 F.2d 1367, 1384, 231 USPQ 81, 94 (Fed. Cir. 1986), cert. denied, 480 U.S. 947 (1987); and Lindemann Maschinenfabrik GMBH v. American Hoist & Derrick Co., 730 F.2d 1452, 1463, 221 USPQ 481, 489 (Fed. Cir. 1984)." (see MPEP §2164.01) Applicant admits that "[h]alftoning is well established" (page 2, lines 17-18 of Applicant's arguments), which is true. Further, though Yoshida may not specifically use the word "halftoning" in the disclosure, for the above reasons, among others, it would be abundantly clear to one of ordinary skill in the art that the invention of Yoshida does, in fact, teach color halftoning.' [page 2, line 16 to page 4, line 7 of said final rejection]

'Examiner also wishes to provide the requested authority for proving that halftoning and a halftone screen is inherent.

(6) Wang (US Patent 5,748,330) demonstrates an electrophotographic printer (column 1, lines 7-10 of Wang) that prints individual dots in a two-dimensional rectangular grid pattern (figures 3A-3D of Wang) by performing halftoning using a halftone screen (column 6, lines 6-15 of Wang). Further, Wang teaches as part of the prior art that halftone printing using said two-dimensional array was already known in the art of digital printing (column 3, lines 54-60 of Wang). Areas of "solid color" are used in the generation of an image (column 3, lines 57-64 of Wang). Applicant will note that Yoshida is also an electrophotographic

printer (column 2, lines 5-9 of Yoshida) that prints individual colors in a superimposed fashion on a print medium to generate a resultant image (column 1, lines 32-36 of Yoshida) using the same sort of two-dimensional rectangular grid as shown in Wang (see figure 5 of Yoshida and figures 3A-3D of Wang). In both Wang and Yoshida, a rectangular grid is used to address column and row of where a dot is to be placed. In fact, this type of representation is commonly used in literature in the halftoning arts to show how the dots are arranged since a high-powered magnifying glass or a microscope is required to see the real dots that are physically printed on a physical medium.

(7) Kroon (US Patent 5,841,458) teaches in the Background how color electrophotographic printing works. Kroon states that:

"Color laser printers implement an electrophotographic process for recording and registering a multi-color image on an electrophotographic surface or a print medium, such as paper. Image data representing each primary color plane and generated in a personal computer are sent to the laser printer, which converts the image data to binary electrical signals that represent the dots forming the image. Each of the binary signals represents either a light or dark state of one dot in the image pattern. Depending on the state of each dot, the binary signals modulate a laser beam either ON or OFF as it is directed to an electrically charged light sensitive surface of a drum, which records the image pattern. A spinning multifaceted mirror scans the modulated laser beam in raster fashion along the length of the drum, and the drum incrementally rotates about its longitudinal axis by one dot position so that each successive scan of the laser beam is recorded in proper registration immediately after the previous scan." [column 1, lines 11-29 of Kroon]

The above quote from Kroon is clearly a description of halftoning and the use of a halftone screen, as commonly understood in the art. Further, Kroon specifically states that halftoning is performed using the color laser printer (column 1, lines 5-9 of Kroon). Again, the printer taught by Yoshida is also an electro-photographic printer (column 2, lines 5-9 of Yoshida) that prints individual colors in a superimposed fashion on a print medium to generate a resultant image (column 1, lines 32-36 of Yoshida). The printing is performed using digital high or low signals to drive the individual printing LED's (figure 10; column 2, lines 5-9; and column 5, line 62 to column 6, line 3 of Yoshida).

Another important similarity between Yoshida and Kroon which demonstrates conclusively that Yoshida teaches halftoning and halftone screens is that Yoshida prints *image data* using the print head (figure 1(5); column 2, lines 10-14 and lines 17-22; and column 5, lines 62-66 of Yoshida), and not mere solid colors as Applicant has alleged on page 8, lines 16-18 of the present arguments. As stated before, the four primary colors of cyan, magenta, yellow and black are commonly used in the art to print image data. Further, the term "image data" as commonly understood in the art relates to images a person would take with a camera, draw, or otherwise generate. "Image data" is not generally a mere splattering of four different

colors, which happen to coincide with the commonly used primary ink colors, in an image space.

(8) Kawakami (US Patent 5,497,180) also demonstrates halftoning (column 15, lines 39-42 of Kawakami) through the use of the same four primary colors as taught by Yoshida (column 15, lines 4-13 of Kawakami). Both Kawakami and Yoshida are performed using a common electro-photographic printer.

(9) As stated above, "A patent need not teach, and preferably omits, what is well known in the art. *In re Buchner*, 929 F.2d 660, 661, 18 USPQ2d 1331, 1332 (Fed. Cir. 1991); *Hybritech, Inc. v. Monoclonal Antibodies, Inc.*, 802 F.2d 1367, 1384, 231 USPQ 81, 94 (Fed. Cir. 1986), cert. denied, 480 U.S. 947 (1987); and Lindemann Maschinenfabrik GMBH v. American Hoist & Derrick Co., 730 F.2d 1452, 1463, 221 USPQ 481, 489 (Fed. Cir. 1984)" (see MPEP §2164.01). Yoshida is concerned with a particular aspect of color printing, namely a printer and printing method that improved color registration through skew-correction (column 1, lines 6-10 of Yoshida). Since color halftoning is clearly old and well-known in the art, Yoshida was not required to discuss the details of how halftoning and halftone screens work, especially since it would have been abundantly clear to those of even basic skill in the art that Yoshida teaches a particular aspect of halftoning. Another example of halftoning that demonstrates the same type of halftoning performed in Yoshida is taught by Berns (*Principles of Color Technology*, by Roy S. Berns, © 2000, John Wiley &

Sons, pages 170-174). Berns demonstrates performing halftoning by printing dots in a rectangular grid (page 172, figure and caption at top of left column; and page 171, left column, lines 1-13 of Berns), which is what the printer of Yoshida does (figure 5 and column 2, line 64 to column 3, line 7 of Yoshida).' [page 5, line 9 to page 8, line 16 of said final rejection]

Appellant argues that Yoshida addresses deskewing, and not reducing artifacts from halftoning (see page 14, lines 9-10 of Appeal Brief).

Examiner responds that, by deskewing the image, and thus correcting the image registration, the image artifacts produced by said image skewing are mitigated when color halftoning is performed (column 1, lines 21-27 of Yoshida).

Appellant's arguments with respect to the Rejection of Claims 1,4,9 and 14 as Anticipated.

Appellant, with respect to claim 1, argues that nothing in Yoshida is suggestive of a halftone screen; and Yoshida does not teach that deskewing occurs first, and then a halftone screen is applied.

Examiner responds that a halftone screen is implicit in the teachings of Yoshida, as has been fully demonstrated above. The

corresponding arguments do not therefore need to be repeated herein.

Furthermore, Yoshida does teach that deskewing occurs before the use of a halftone screen (see page 12 of said final rejection). A deskewing unit performs the skew correction for the printing heads (column 2, lines 15-17 of Yoshida). Printing, and thus halftoning, is controlled by the deskewing unit (column 2, lines 15-17 of Yoshida). When the image data to be printed is supplied to the printing head, the image data is selected according to the settings of the deskewing unit (column 2, lines 17-22 of Yoshida). The compensation for the printing head skew (column 2, lines 15-17 of Yoshida) occurs before the application of a halftone screen, said halftone screen being implicitly applied since yellow and magenta are printed as dots by the printing head (column 2, line 64 to column 3, line 2 of Yoshida). Furthermore, the image data is selected according to the settings of the deskewing unit, which compensates for the print skew *before* the data is supplied to the printing head (column 2, lines 17-22 of Yoshida). If a halftone screen were applied either before the deskewing or simultaneously with the deskewing, then the data selector would not be selecting the image data *according to the settings of the deskewing unit* (column 2, lines 19-21 of Yoshida).

Appellant, with respect to Claim 4, argues that Yoshida does not teach degrees of lightness, and thus does not teach halftoning. Furthermore, Appellant discusses the references provided by Examiner in said final rejection.

Examiner responds that halftoning is implicit in the teachings of Yoshida, as has been fully demonstrated above. The corresponding arguments do not therefore need to be repeated herein. Furthermore, image bytemaps are clearly taught by Yoshida, as set forth on page 13, lines 1-17 of said final rejection, and quoted herein:

> [Yoshida discloses] 'generating from said continuous tone data a plurality of image bytemaps (column 2, lines 12-14 and lines 17-18 of Yoshida), each of said plurality of image bytemaps corresponding to a respective one of a plurality of image planes (column 2, line 64 to column 3, line 5 of Yoshida) and to a respective one of said plurality of printheads (column 2, lines 29-32 of Yoshida); and applying electronic printhead skew correction (figure 4 and column 2, lines 19-22 of Yoshida) to each image bytemap associated with a printhead unit requiring printhead skew correction (column 2, lines 58-63 of Yoshida) to generate a corresponding skew corrected

image bytemap (column 2, lines 19-22 of Yoshida). Since image data is supplied for printing (column 2, lines 17-19 of Yoshida) and there are a plurality of print heads (column 2, lines 59-61 of Yoshida), then there are inherently a plurality of image bytemaps, since each bytemap is the data that each corresponding print head needs to print.' [page 13, lines 1-17 of said final rejection]

Finally, on page 16, lines 6-23 of the Appeal Brief, Appellant is merely giving a personal summary and a personal opinion of the references provided by Examiner as additional evidence. Examiner has fully demonstrated above how the provided references demonstrate that halftoning and halftone screens are inherent in Yoshida.

Appellant, with respect to Claim 9, argues the same points addressed with respect to claim 4. Thus, the arguments presented in this section have already been fully addressed above.

Appellant, with respect to Claim 14, argues that Yoshida does not teach a halftone screen; and that a pre-compensated halftone screen is not applied before skew correction.

Examiner responds that a halftone screen is implicit in the teachings of Yoshida, as has been fully demonstrated above. The

corresponding arguments do not therefore need to be repeated herein.

Furthermore, the yellow halftone screen is pre-compensated since the magenta printing head is skew corrected with respect to the yellow head (column 3, lines 5-7 and lines 19-28 of Yoshida). The yellow halftone screen is pre-compensated since the yellow halftone screen does not have to be skew corrected. It is the magenta printing head that is skew corrected with respect to the yellow printing head. The relative required position between the magenta printing head and the yellow printing head is known beforehand, and thus before the magenta head requires skew correction (column 2, lines 58-63 of Yoshida). Thus, the pre-compensation of the yellow halftone screen is performed prior to any skew correction.

Appellant's arguments with respect to the Rejection of Claims 2,5-6,15 and 17-19 as Obvious.

Appellant, with respect to Claims 2, 5, 15 and 19, argues that claims 2, 5, 15 and 19 are allowable owing to their dependence from allegedly allowable claims.

Examiner responds that, since the claims from which claims 2, 5, 15 and 19 respectively depend have been demonstrated to be taught by the prior art, and Appellant does not argue with

respect to the rejections of the limitations specifically found in claims 2, 5, 15 and 19, then claims 2, 5, 15 and 19 are clearly not allowable over the prior art.

Appellant, with respect to Claims 2, 5-6, 15 and 17-19, argues that Yoshida does not disclose continuous data or generating a plurality of bytemaps (see page 19, lines 10-12 of Appeal Brief).

Examiner responds that continuous data and generating a plurality of bytemaps is implicit in the teachings of Yoshida, as has already been fully addressed above.

Appellant, with respect to Claims 2, 5-6, 15 and 17-19, argues that Cullen (US Patent 5,854,854) does not teach preserving individual characters (see page 19, line 13 to page 20, line 7 of Appeal Brief).

Examiner replies that, in response to Appellant's argument that the references fail to show certain features of Appellant's invention, it is noted that the features upon which Appellant relies (i.e., preserving individual characters) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Appellant, with respect to Claims 2, 5-6, 15 and 17-19, argues that Kamitani (US Patent 6,327,385 B1) does not associate characters to anything at all similar since Kamitani is about segmenting characters (see page 20, lines 8-13 of Appeal Brief).

Examiner responds that Appellant is merely alleging that Kamitani does not teach associating characters with a respective portion. Kamitani has clearly been demonstrated to teach associating characters with a respective portion in figure 7a and on column 7, lines 28-32 and lines 36-43 of Kamitani, as clearly set forth on page 18, lines 10-13 of said final rejection. Kamitani states therein "When the font of characters constituting the string is determined as one having serif, the masking is performed for the objective picture prior to the procedures for obtaining the character separating feature" [column 7, lines 28-32 of Kamitani] and "FIG. 7 is a masked image in a case where a mask pattern is defined such that 'an upper and lower areas of an image, each corresponding to 2 pixels, are excluded from the character separating feature extracting area.'" [column 7, lines 36-43 of Kamitani]. Thus, based on a particular character separating feature, characters are associated with respective portions.

Appellant, with respect to Claims 2, 5-6, 15 and 17-19, argues that the desirability is not recognized in any of the

references of deskewing a character partially in one deskew block based on the deskew factor of another block so that a character is not distorted by being partly deskewed in one amount and partly deskewed in another amount (see page 20, lines 14-16 of Appeal Brief).

Examiner responds that Appellant is relying upon his own personal interpretation of the recited claim language of claims 2, 5-6, 15 and 17-19, and not claims 2, 5-6, 15 and 17-19 as actually recited. Appellant has not argued with respect to specific limitations of the recited claims. Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Appellant's arguments with respect to the Rejection of Claims 11 and 12 as Obvious.

Appellant argues that Yoshida does not disclose continuous tone data or generating a plurality of bytemaps (see page 20, line 24 to page 21, line 10 of Appeal Brief).

Examiner responds that, as Appellant states on page 21, lines 7-9 of the Appeal Brief, the arguments with respect to continuous tone data and generating a plurality of bytemaps have already been discussed with respect to claim 4. Examiner has

fully addressed Appellant's arguments in the above section that addresses Appellant's arguments regarding claim 4.

Appellant argues that Cullen does not teach bridging characters, and that Cullen thus teaches away from claim 11 (see page 21, lines 11-22 of Appeal Brief).

Examiner responds that Cullen does not teach away from the actual recitation of claim 11. Appellant may have a specific intended use in mind for the invention recited in claim 11, but the actual limitations recited in claim 11 have been taught by the prior art. Furthermore, claim 11 recites "for each text character bridging a block boundary between an associated block and an adjacent block, performing the step of shifting ..." but does not in any way require that text characters bridge the block boundary. Cullen discloses "that each rectangular block is corrected for the corresponding skew correction (column 14, lines 51-57 of Cullen). Therefore, if there is a text character bridges a block boundary between an associated block and an adjacent block, then the portion of said character in the associated block will inherently be skew corrected by the skew correction performed for said associated block and the portion of said character in the adjacent block will inherently be skew corrected by the skew correction formed for said adjacent block." [page 24, lines 1-9 of said final rejection]

Appellant argues that Saund (US Patent 5,835,241) does not teach shifting a minority portion of each character (see page 21, line 23 to page 22, line 2 of Appeal Brief).

Examiner responds that the combination of references, specifically Saund *combined with Yoshida in view of Cullen*, fully teaches the disputed limitation. Said final rejection states:

> "Saund discloses using interpolating image data (column 13, lines 48-54 of Saund) in order to display said image data in a properly de-warped image space (column 13, lines 31-34 of Saund).
>
> Yoshida in view of Cullen is combinable with Saund because they are from the same field of endeavor, namely the alignment of image data. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to interpolate the image data to correct for warping, as taught by Saund. A text character bridging a block boundary between an associated block and an adjacent block would therefore have a minority portion shifted by an amount corresponding to a difference between a skew correction factor corresponding to said associated block and a skew correction factor corresponding to said adjacent block since the warping, or skew correction, amount for said minority portion would be an interpolation between said associated block and said adjacent block. The motivation for doing so would have been to properly show each pixel of an

> image in the transformed image space (column 13, lines 25-27 of Saund). Therefore, it would have been obvious to combine Saund with Yoshida in view of Cullen to obtain the invention as specified in claim 11." [page 25, lines 7-28 of said final rejection]

Thus, the *combination* of references is what fully teaches the recited claim, not the individual references themselves.

Appellant argues that Yoshida does not teach applying a halftone screen (see page 22, lines 3-5 of Appeal Brief).

Examiner responds that applying a halftone screen is implicit in the teachings of Yoshida, as has been fully demonstrated above. The corresponding arguments do not therefore need to be repeated herein.

Appellant argues that the desirability is not recognized in any of the references of deskewing a character partially in one deskew block based on the deskew factor of another block so that a character is not distorted by being partly deskewed in one amount and partly deskewed in another amount (see page 22, lines 6-8 of Appeal Brief).

Examiner responds that claim 11 does not recite the language disputed by Appellant. The actual limitations of claim 11 recite "shifting a minority portion of said each text character located in said adjacent block not present in said

associated block by an amount corresponding to a difference between a skew correction factor corresponding to said associated block and a skew correction factor corresponding to said adjacent block". As is well-known, although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993). Further, Examiner is required to give the broadest reasonable interpretation of the claims consistent with the specification (MPEP §2111).

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

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